Heavy Duty OBD Testing Requirements

- Demonstration Testing
- Production Vehicle Evaluation (PVE) Testing
  1. Verification of Standardized Requirements
  2. Verification of Monitoring Requirements
  3. Verification of In-Use Monitoring Performance

Demonstration Testing

- What: Section (i) of the proposed regulation, commonly referred to as "DDV" testing.
- Why: ENGINE emission tests with "threshold parts" to show that the malfunction is detected and MIL is illuminated at the malfunction criteria.
- How:
  - Single fault testing.
  - Engine/emission control system aged to useful life.
  - Component being evaluated is deteriorated to the malfunction threshold.
  - Perform applicable emission test procedure to show that malfunction is detected and MIL is illuminated at required emission levels.

Demonstration Testing Summary - Diesel

Component	2007-2009 Model Years	2010+ Model Years
Fuel System	cannot achieve target high/low	high/low pressure @ 1.5 x std advanced/retarded timing @ 1.5 x std high/low quantity @ 1.5 x std multiple injections @ 1.5 x std
Misfire	None	None
EGR	cannot achieve target high/low cooler functional check	high/low flow @ 1.5 x std response @ 1.5 x std cooling @ 1.5 x std
Boost Control	cannot achieve target high/low	over/under boost @ 1.5 x std response @ 1.5 x std cooling @ 1.5 x std
Catalyst	functional check empty can	efficiency @ 1.75 x std empty can
NOx Adsorber	functional check empty can	trapping @ 1.5 x std empty can
PM Trap	insufficient pressure excessive pressure empty can	trapping @ 1.5 x std regeneration @ 1.5 x std empty can
VVT	cannot achieve target high/low	target @ 1.5 x std response @ 1.5 x std

Demonstration Testing Summary - Gas

Component	2007+ Model Years
Fuel System	primary feedback high @ 1.5 x std primary feedback low @ 1.5 x std secondary feedback high @ 1.5 x std secondary feedback low @ 1.5 x std
Misfire	misfire @1.5 x std
EGR	high flow @ 1.5 x std low flow @ 1.5 x std
Cold Start	each component @ 1.5 x std
Catalyst	efficiency @ 1.75 x std empty can
Secondary Air	high flow @ 1.5 x std low flow @ 1.5 x std
Exhaust gas sensor	response @ 1.5 x std other @ 1.5 x std
VVT	response @ 1.5 x std target @ 1.5 x std

Demonstration Testing, Cont'd

- When: Data are required before certification.
- How Many: 1-3 high-mileage/durability ENGINES per year depending on number of engine families certified:
  - 1-5 engine families => 1 demo engine
  - 6-10 engine families => 2 demo engines
  - 11+ engine families => 3 demo engines
- Confirmatory Testing: Manufacturer has to make test equipment available to ARB upon request.

Verification of Standardized Requirements

- What: Section (l)(1) of the proposed regulation.
- Why: Verify that the production VEHICLE properly communicates within ISO & SAE specifications to a generic scan tool.
- How: Uses standardized engineering-type test equipment.
  - Standardized verification software/standardized hardware for test equipment/vehicle interface.
  - Software initiates test and generates report.

Verification of Standardized Requirements, Cont'd

- When: Data are required within six months of the start of engine production.
- How Many: Enough to be representative of all VEHICLES produced for the model year.
  - Mfr. submit test plan to ARB.
  - Representative testing for vehicles with identical communication-related software and calibration.

Verification of Monitoring Requirements

- What : Section (l)(2) of the proposed regulation.
- Why: Demonstrate on a production VEHICLE that each diagnostic can detect a malfunction, store a fault code, and illuminate the MIL.
- How:
  - Single fault testing.
  - NO emissions test or threshold components.
  - Install malfunctioning component/simulate malfunction (e.g., bad component, breakout box, simulator).
  - Operate vehicle in monitoring conditions until MIL is on and fault code is stored.

Verification of Monitoring Requirements, Cont'd

- When: Data are required within six months of the start of production.
- How Many: 2, 4, or 6 vehicles per model year depending on number of engine families:
  - 1-5 engine families => 2 demo vehicles
  - 6-10 engine families => 4 demo vehicles
  - 11+ engine families => 6 demo vehicles

Verification of In-Use Monitoring Performance

- What: Section (l)(3) of the proposed regulation.
- Why: To provide data from consumer VEHICLES on in-use monitoring frequency.
- When: Data are required within six months of the start of production/vehicles first introduced into commerce.

Verification of In-Use Monitoring Performance, Cont'd

- How/How Many: Data representative of all VEHICLES produced for the model year.
  - Plan to ARB for representative data for all vehicle configuration. Plan includes number of vehicles and where data are collected.
  - Data stored in on-board computer and downloaded via a generic scan tool.